

**Minutes of Devils Lake Advisory Committee**  
**Modeling Subcommittee**  
**December 8, 2009**

Bruce Engelhardt opened the meeting, introductions were given by the participants of the meeting.

Skip Vecchia presented a power point presentation on the stochastic model approach to the upper Sheyenne River. The “6-Box Model” of Devils Lake was started approximately 10 years ago. This model involves the lake system of Devils Lake divided into 6 homogeneous boxes. This model is an inflow model and takes into consideration surface hydrology as well as ground water hydrology, flux of sulfate from bed sediments, and mixing between lake boxes.

The stochastic model uses monthly data whereas deterministic models uses daily data such as evaporation and precipitation. The deterministic model will be used for Lake Ashtabula. The deterministic model involves water and sulfate mass-balance. The monthly output from the stochastic model will be disaggregated into daily data for input to the deterministic model for Lake Ashtabula.

Increases in sulfates in the upper Sheyenne River were observed in about 2000 from ground water rising – models will use conservative (higher) sulfate values. Rising groundwater tables are causing more sulfates in the near-surface soils in some part of the basin, which are being transported to the river from surface runoff that comes in contact with the soils.

Joel Galloway talked about the deterministic modeling for Lake Ashtabula. Synoptic data needed – the Corps has been doing samples. There is some stratification of Lake Ashtabula. The deterministic model that will be used is “CE-QUAL-W2”. Sulfate can be tracked with sampling data. Ice will make difference on sulfate concentrations in lake. The time for the modeling can be set up for different dates. Predictions of flows can be determined in winter but is difficult to do.

The Sheyenne River is used for Fargo’s water supply, and has been used for 65-70 days per year, especially if the Red River is in drought. The Horace gaging station will be used for prediction of water quality properties at Fargo’s water intake. There was discussion of Fargo’s sulfate threshold, it depends on time of year but 325 mg/L was suggested.

Variability of sulfate is natural on the Sheyenne River, more so than in Devils Lake. A comment was made that the sulfate level from runoff is dependent upon the particular soil, some soils have higher sulfate levels than other soils.

It was decided that the stochastic model would be used to model the Sheyenne River below Baldhill Dam.

The lake model should be completed by May and the stochastic model of the Sheyenne in February.

It was decided that the next meeting would be in February. The Power Point Presentation was to be put on the SWC website.